

**What is claimed is:**

1. An optical add/drop multiplexing apparatus, to which first to fourth input lines, first to fourth  
5 output lines, an add line, and a drop line are connected, said apparatus comprising:

four first optical devices for splitting signals that are input from the first to fourth input lines, respectively;

10 four first switches disposed corresponding to the first to fourth output lines, respectively;

four second switches disposed corresponding to the first to fourth output lines, respectively;

a pair of third switches;

15 a drop unit for guiding a signal split by said first optical devices to the drop line; and

an add unit for guiding a signal received from the add line to said second switches,

20 wherein one of said pair of third switches guides a signal received from a second switch assigned for the first and second output lines to a first switch assigned for the third and fourth output lines,

25 wherein the rest of said pair of third switch guides a signal received from a second switch

assigned for the third and fourth output lines to a first switch assigned for the first and second output lines,

5 wherein said four first switches output signals split by said corresponding first optical devices or signals received from said third switches, and

10 wherein the four second switches output signals received from said corresponding four first switches or signals received from the add unit to the corresponding output lines.

2. The optical add/drop multiplexing apparatus according to claim 1,

15 wherein said first switches are 2 x 1 switches, said second switches are 2 x 2 switches, and said third switches are 2 x 2 switches.

20 3. The optical add/drop multiplexing apparatus according to claim 1,

wherein the drop line contains first and second drop lines,

wherein the drop unit comprises:

25 four second optical devices for splitting signals split by said four first optical devices;

a switch for guiding one of the signals split by said four second optical devices to the first drop line; and

a switch for guiding one of the signals split  
5 by said four second optical devices to the second drop line.

4. The optical add/drop multiplexing apparatus according to claim 1,

10 wherein the drop line contains first and second drop lines,

wherein the drop unit comprises:

two 2 x 2 switches for exchanging the signals split by said first optical devices; and

15 two 2 x 1 switches for guiding the signals exchanged by said two 2 x 2 switches to the first and second drop lines.

5. The optical add/drop multiplexing apparatus  
20 according to claim 1,

wherein the drop line contains first to fourth drop lines, and

wherein the drop unit comprises:

two 2 x 2 switches for exchanging the signals  
25 split by said first optical devices; and

two 2 x 2 switches for guiding the signals exchanged by said two 2 x 2 switches to the first to fourth drop lines.

5 6. The optical add/drop multiplexing apparatus according to claim 1,

wherein the add line contains first and second add lines, and

wherein the add unit comprises:

10 two third optical devices for splitting signals received from the first and second add lines; and

two switches for guiding the signals split by said third optical devices to said second switches.

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7. The optical add/drop multiplexing apparatus according to claim 1,

wherein the add line contains first to fourth add lines, and

20 wherein the add unit comprises:

two first 2 x 2 switches for exchanging signals received from the first to fourth add lines; and

25 two second 2 x 2 switches for guiding the signals exchanged by said two first 2 x 2 switches

to said second switches.

8. The optical add/drop multiplexing apparatus according to claim 1,

5        wherein said add unit has a switch for guiding a low priority signal to second switches assigned for the third and fourth output lines, the priority of the low priority signal being lower than the priority of a signal received from the add line,  
10        and

         wherein said drop unit has a switch for guiding a signal received from said first optical devices assigned for the third and fourth input lines to a line different from the drop line.

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9. The optical add/drop multiplexing apparatus according to claim 1,

         wherein the add unit has a switch for guiding a low priority signal to second switches assigned  
20        for the third and fourth output lines, the priority of the low priority signal being lower than the priority of a signal received from the add line,  
         and

         wherein the drop unit has an optical device  
25        for splitting a signal received from first optical

devices assigned for the third and fourth input lines and guiding the split signal to a line different from the drop line.

5 10. The optical add/drop multiplexing apparatus according to claim 1, further comprising:

four first optical circulators for guiding  
signals received from the first to fourth input  
lines to corresponding transmission lines and  
10 guiding signals received from the transmission  
lines to the first to fourth output lines,  
respectively; and

four second optical circulators for guiding  
signals received from the transmission lines to the  
15 corresponding first optical devices and guiding  
signals that are output from said second switches  
to the corresponding transmission lines.

20 11. The optical add/drop multiplexing apparatus according to claim 1, further comprising:

adjusting means, disposed between said second  
switches and the corresponding output lines, for  
adjusting the levels of signals to be output to the  
output lines; and

25 a controller controlling said adjusting means

corresponding to the states of the first to third switches.

12. The optical add/drop multiplexing apparatus  
5 according to claim 1, further comprising:

adjusting means, disposed between said second switches and the corresponding output lines, for adjusting the levels of signals to be output to the output lines; and

10 a controller detecting the levels of signals to be output to the output lines and controlling the adjusting means corresponding to the detected results.

15 13. The optical add/drop multiplexing apparatus according to claim 1,

wherein the first to fourth input lines and the first to fourth output lines each transmit multi-wavelength light,

20 wherein said first optical devices, said first switches, said second switches, said third switches, said drop unit, and said add unit are disposed corresponding to individual wavelengths, and

wherein said apparatus further comprises:

25 four demultiplexers for demultiplexing the

multi-wavelength light received from the first to fourth input lines into signals with individual wavelengths and guiding the demultiplexed signals to the corresponding first optical devices; and

5           four multiplexers for multiplexing signals that are output from the second switches provided corresponding to individual wavelengths and outputting the multiplexed light to the first to fourth output lines.

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14. The optical add/drop multiplexing apparatus according to claim 13, further comprising:

adjusting means, disposed between the second switches provided corresponding to individual wavelengths and the corresponding multiplexers, for  
15           adjusting the levels of signals; and

a controller controlling said adjusting means so that the multi-wavelength light that is output from the multiplexers is equalized.

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15. An optical transmission system having a plurality of optical add/drop multiplexing apparatuses connected with a clockwise work line, a counterclockwise work line, a clockwise protection  
25           line, and a counterclockwise protection line in a



